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TOWNSEND AND TOWNSEND AND CREW LLP
TWO EMBARCADERO CENTER
8TH FLOOR
SAN FRANCISCO, CA 94111-3834

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/397,494
Filing Date: September 15, 1999
Appellant(s): BALABAN ET AL.

Kent J. Tobin
For Appellant

EXAMINER'S ANSWER

This is in response to the Appeal Brief filed January 17, 2006, appealing from the Office action mailed July 13, 2005.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The Examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The Appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The Appellant's statement of the grounds of rejection to be reviewed on appeal is substantially correct. The changes are as follows:

Group I: Claims 47 and 48 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over McCasky Feazel et al. '030 in view of Layne et al. '731 and Wong et al. '859 and further in view of Lipshutz '729.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

5,968,731	LAYNE et al.	10-1999
5,723,320	DEHLINGER	03-1998
4,875,859	WONG et al	10-1989
6,100,030	MCCASKY FEAZEL et al.	8-2000
6,046,165	LAUGHON et al.	4-2000
5,733,729	LIPSHUTZ et al.	3-1998
3,657,537	WHEELESS, JR. et al.	4-1972

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 26, 31, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,968,731 to Layne et al. in view of U.S. Patent No. 5,723,320 to Dehlinger.

Layne discloses a method for a user interface to accept laboratory experiment information for control of a laboratory experiment (column 3, line 60 to column 4, line 9), the method using a computer system, the computer system including a processing system coupled to a network, wherein a user input device and processor are coupled to the processing system (column 8, lines 13-20 and Figure 5), the method comprising accepting signals from the user input device to define a parameter of an experiment (column 8, lines 27-30 and column 15, lines 58-33), transferring the parameter to the network (column 8, lines 27-30), receiving experiment results from the network, wherein the experiment results include results from an experiment using the parameter, and outputting the experiment results on the computer system (column 8, lines 34-37 and column 15, lines 38-40) via a coupled display device (column 11, lines 30-38).

Layne also discloses executing the method using computer program instructions embodied on a computer-readable medium (column 10, lines 4-17).

Layne further discloses accepting signals from the user to indicate a target database for publishing experiment results (column 8, lines 38-41 and column 15, lines 40-41).

As noted above, the invention of Layne teaches many of the features of the claimed invention and while Layne discloses that the experiment is an experiment performed on a fluorescent probe (column 13, lines 63-66), Layne does not specifically indicate that the probe is arranged as part of a probe array.

Dehlinger teaches fluorescent probes arranged as part of a probe array (column 1, lines 37-42 and column 13, lines 62-66).

It would have been obvious to one having ordinary skill in the art to modify the invention of Layne to include specifying that the probe is arranged as part of a probe array, as taught by Dehlinger, because, as suggested by Dehlinger, the combination would have improved probe diagnosis and gene-expression studies by using probes arranged at predetermined locations as part of an array (column 13, line 54 to column 14, line 12).

Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Layne et al. in view of Dehlinger and further in view of U.S. Patent No. 4,875,859 to Wong et al.

As noted above, the invention of Layne and Dehlinger teaches many of the features of the claimed invention and while the invention of Layne and Dehlinger does include software modules for describing, to the user, how to use the test instruments (Layne, column 10, lines 33-37) as well as for explaining how the test facility is used along with test methodology (Layne, column 11, lines 30-35), the combination does not specifically display steps of setup and execution of the experiment.

Wong teaches a method and apparatus for guiding a user during setup of a signal measurement system including a display for textually and pictorially presenting the steps of setup and execution to the user (column 1, lines 55-60).

It would have been obvious to one having ordinary skill in the art to modify the invention of Layne and Dehlinger to include specifically displaying steps of setup and execution of the experiment, as taught by Wong, because, as suggested by Wong, the combination would have provided a method for insuring that the proper instruments are setup and necessary parameters are obtained in selecting the correct desired test/measurement process (column 2, lines 1-5 and column 4, line 55 to column 5, line 11).

Claims 26-31, 34-36, 41, 42, 51, 52, 57, and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,100,030 to McCasky Feazel et al. in view of Layne et al.

McCasky Feazel discloses the use of selective DNA fragment amplification products for hybridization-based genetic fingerprinting, marker assisted selection, and high-throughput screening for use in a laboratory (i.e. probe array) experiment (abstract) comprising accepting signals/input data from a user input device, through a computer interface, inherently with associated instructions (column 43, lines 27-38), to define a parameter of an experiment, including data to define a probe array image identifier (column 50, lines 42-49 and column 52, lines 54-62) and a probe array analysis set and type (i.e. experiment ID, sample ID, and plate type) (column 44, lines 10-35) by displaying setup prompts on a corresponding display (column 44, line 60 to column 45, line 3, column 45, lines 52-63, and column 44, lines 10-35). McCasky Feazel also discloses that the accepted signals are used to control

scanning and hybridization (column 30, lines 7-32, column 37, lines 21-43 and column 42, line 55 to column 43, line 9).

McCasky Feazel also discloses exporting/transferring the received parameters to a processor to generate experimental results (column 44, lines 36-38) and display the experimental results experiment/array images (column 53, lines 1-3), indicating hybridization information (column 3, lines 30-56), as well as displaying the current state of the experimental operation (column 49, lines 31-43). McCasky Feazel also discloses receiving from the user signals/data indicating a target output file (column 46, lines 3-18).

While McCasky Feazel does describe producing and exporting a target output file, McCasky Feazel does not specifically disclose conducting the experiment over a network (i.e. transferring parameters to a network and receiving experiential results from the network).

Layne discloses a method for a user interface to accept laboratory experiment information for control of a laboratory experiment (column 3, line 60 to column 4, line 9), the method using a computer system, the computer system including a processing system coupled to a network, wherein a user input device and processor are coupled to the processing system (column 8, lines 13-20 and Figure 5), the method comprising accepting signals from the user input device to define a parameter of an experiment (column 8, lines 27-30 and column 15, lines 58-33), transferring the parameter to the network (column 8, lines 27-30), receiving experiment results from the network, wherein the experiment results include results

from an experiment using the parameter, and outputting the experiment results on the computer system (column 8, lines 34-37 and column 15, lines 38-40) via a coupled display device (column 11, lines 30-38).

Layne also discloses executing the method using computer program instructions embodied on a computer-readable medium (column 10, lines 4-17).

Layne further discloses accepting signals from the user to indicate a target database for publishing experiment results (column 8, lines 38-41 and column 15, lines 40-41).

It would have been obvious to one having ordinary skill in the art to modify the invention of McCasky Feazel to include conducting the experiment over a network, as taught by Layne, because, as suggested by Layne, the combination would have provided a method for allowing access to biological samples in areas where access to laboratory materials and procedures is limited (column 8, lines 1-12) as well as provide means for linking the process to additional information and/or additional users to allow more through analysis by sharing samples (column 8, lines 38-43 and column 10, line 64 to column 11, line 11).

Claims 32, 43, 44, 49 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCasky Feazel et al. in view of Layne et al. and further in view of Wong et al.

As noted above, the invention McCasky Feazel and Layne teaches many of the features of the claimed invention and while the combination does include software

modules for describing, to the user, how to use the test instruments (Layne, column 10, lines 33-37) as well as for explaining how the test facility is used along with test methodology (Layne, column 11, lines 30-35), the combination does not specifically display steps of setup and execution of the experiment.

Wong teaches a method and apparatus for guiding a user during setup of a signal measurement system including a display for textually and pictorially presenting the steps of setup and execution to the user (column 1, lines 55-60).

It would have been obvious to one having ordinary skill in the art to modify the invention of McCasky Feazel and Layne to include specifically displaying steps of setup and execution of the experiment, as taught by Wong, because, as suggested by Wong, the combination would have provided a method for insuring that the proper instruments are setup and necessary parameters are obtained in selecting the correct desired test/measurement process (column 2, lines 1-5 and column 4, line 55 to column 5, line 11).

Claims 37, 38, 53, and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCasky Feazel et al. in view of Layne et al. and further in view of U.S. Patent No. 6,046,165 to Laughon.

As noted above, the combination of McCasky Feazel and Layne teaches many of the features of the claimed invention and while the combination does teach accepting signals to define a probe array experiment as well as that the parameter comprises a probe array image identifier and a probe array analysis set and type, as

well as control signals to provide a grid to aid in data visualization (McCasky Feazel, column 52, line 63 to column 53, line 3), the combination does not explicitly indicate that the signals control grid alignment.

Laughon et al. teaches compositions and methods for identifying and testing TGF-β pathways against agonists and antagonists including signals used for sequence identification as well as for aligning a grid to an image scan using the known dimensions of the array (column 33, lines 64-67).

It would have been obvious to one having ordinary skill in the art to modify the invention of McCasky Feazel and Layne to specifically indicate that the signals control grid alignment, as taught by Laughon, because the invention of McCasky Feazel and Layne does disclose the use of a grid aligned to aid in data visualization and, as suggested by Laughon, the combination would have provided means for properly aligning the grid to the resulting data in order to insure that the data provided to the user is accurate and therefore that the resulting analysis is also accurate (column 33, line 64 to column 24, line 34).

Claims 39, 40, 55, and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCasky Feazel et al. in view of Layne et al. and further in view of U.S. Patent No. 5,733,729 to Lipshutz et al.

As noted above, the combination of McCasky Feazel and Layne teaches many of the features of the claimed invention and while the combination does teach computer instructions for accepting signals to define a probe array experiment as

well as that the parameter comprises a probe array image identifier and a probe array analysis set and type, the combination does not specifically indicate that the signals control cell average analysis.

Lipshutz et al. teaches computer-aided probability base calling for arrays of nucleic acid probes on chips including means for analyzing a cell average (column 9, lines 17-28).

It would have been obvious to one having ordinary skill in the art to modify the invention of McCasky Feazel and Layne to specifically indicate that the signals control cell average analysis, as taught by Lipshutz, because the combination of McCasky Feazel and Layne does teach determining a probe intensity measurement (column 37, lines 21-43) and, as suggested by Lipshutz, the combination would have improved analysis by determining a plurality of intensities for each cell and obtaining an average therefrom as well as improving analysis by allowing the calculation of a probability and corresponding confidence with respect to the identified probe (column 10, lines 16-36 and column 11, lines 7-67).

Claims 39, 40, 55, and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCasky Feazel et al. in view of Layne et al. and further in view of U.S. Patent No. 3,657,537 to Wheeless, Jr. et al.

As noted above, the combination of McCasky Feazel and Layne teaches many of the features of the claimed invention and while the combination does teach computer instructions for accepting signals to define a probe array experiment as

well as that the parameter comprises a probe array image identifier and a probe array analysis set and type, the combination does not specifically indicate that the signals control cell average analysis.

Wheeless teaches a computerized slit-scan cyto-fluorometer for automated cell recognition including means for examining fluorescent probes (column 1, lines 11-28) by obtaining a plurality of intensity values and determining an averaged scan of fluorescence along the cell (column 2, lines 61-67).

It would have been obvious to one having ordinary skill in the art to modify the invention of McCasky Feazel and Layne to specifically indicate that the signals control cell average analysis, as taught by Wheeless, because the combination of McCasky Feazel and Layne does teach determining a probe intensity measurement (column 37, lines 21-43) and, as suggested by Wheeless, the combination would have provided means for determining an average intensity that is useful in order to pictorially illustrate the boundaries of the cell under analysis thereby obtaining important parameters in an accurate method with clear graphical results (column 2, lines 61-67 and column 5, line 72 to column 6, line 6).

Claims 45 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCasky Feazel et al. in view of Layne et al. and Wong further in view of Laughon.

As noted above, the combination of McCasky Feazel, Layne, and Wong teaches many of the features of the claimed invention and while the combination does teach

accepting signals to define a probe array experiment as well as that the parameter comprises a probe array image identifier and a probe array analysis set and type, as well as control signals to provide a grid to aid in data visualization (McCasky Feazel, column 52, line 63 to column 53, line 3) and display setup and execution, the combination does not explicitly indicate that the signals control grid alignment.

Laughon et al. teaches compositions and methods for identifying and testing TGF-β pathways against agonists and antagonists including signals used for sequence identification as well as for aligning a grid to an image scan using the known dimensions of the array (column 33, lines 64-67).

It would have been obvious to one having ordinary skill in the art to modify the invention of McCasky Feazel, Layne, and Wong to specifically indicate that the signals control grid alignment, as taught by Laughon, because the invention of McCasky Feazel, Layne, and Wong does disclose the use of a grid aligned to aid in data visualization and, as suggested by Laughon, the combination would have provided means for properly aligning the grid to the resulting data in order to insure that the data provided to the user is accurate and therefore that the resulting analysis is also accurate (column 33, line 64 to column 24, line 34).

Claims 47 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCasky Feazel et al. in view of Layne et al. and Wong further in view of Lipshutz et al.

As noted above, the combination of McCasky Feazel, Layne, and Wong teaches many of the features of the claimed invention and while the combination does teach computer instructions for accepting signals to define a probe array experiment as well as that the parameter comprises a probe array image identifier and a probe array analysis set and type, as well as control signals to display setup and execution, the combination does not specifically indicate that the signals control cell average analysis.

Lipshutz et al. teaches computer-aided probability base calling for arrays of nucleic acid probes on chips including means for analyzing a cell average (column 9, lines 17-28).

It would have been obvious to one having ordinary skill in the art to modify the invention of McCasky Feazel, Layne, and Wong to specifically indicate that the signals control cell average analysis, as taught by Lipshutz, because the combination of McCasky Feazel, Layne, and Wong does teach determining a probe intensity measurement (column 37, lines 21-43) and, as suggested by Lipshutz, the combination would have improved analysis by determining a plurality of intensities for each cell and obtaining an average therefrom as well as improving analysis by allowing the calculation of a probability and corresponding confidence with respect to the identified probe (column 10, lines 16-36 and column 11, lines 7-67).

Claims 47 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCasky Feazel et al. in view of Layne et al. and Wong further in view of Wheeless, Jr. et al.

As noted above, the combination of McCasky Feazel, Layne, and Wong teaches many of the features of the claimed invention and while the combination does teach computer instructions for accepting signals to define a probe array experiment as well as that the parameter comprises a probe array image identifier and a probe array analysis set and type, as well as control signals to display setup and execution, the combination does not specifically indicate that the signals control cell average analysis.

Wheeless teaches a computerized slit-scan cyto-fluorometer for automated cell recognition including means for examining fluorescent probes (column 1, lines 11-28) by obtaining a plurality of intensity values and determining an averaged scan of fluorescence along the cell (column 2, lines 61-67).

It would have been obvious to one having ordinary skill in the art to modify the invention of McCasky Feazel, Layne, and Wong to specifically indicate that the signals control cell average analysis, as taught by Wheeless, because the combination of McCasky Feazel, Layne, and Wong does teach determining a probe intensity measurement (column 37, lines 21-43) and, as suggested by Wheeless, the combination would have provided means for determining an average intensity that is useful in order to pictorially illustrate the boundaries of the cell under analysis

thereby obtaining important parameters in an accurate method with clear graphical results (column 2, lines 61-67 and column 5, line 72 to column 6, line 6).

(10) Response to Argument

Appellant first argues with respect to the rejection of claims 26, 31 and 34 under 35 U.S.C. § 103(a) as being unpatentable over Layne et al. in view of Dehlinger:

> Layne et al. '731 relates to testing of biological specimens with only a conventional testing apparatus comprising a 96-well microtiter plate (212), in conjunction with robotic fluid handing apparatus...Layne et al. '731 fails to include any teaching, or even suggestion, regarding transmitting parameters for a probe array experiment over a computer network, or communication of results from such a probe array experiment, over a computer network.
>
> In an effort to provide such a teaching, the Examiner has combined Layne et al. '731 with Dehlinger '320. In order to establish a prima facie case of obviousness, "there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings." (MPEP 2143).
>
> As previously noted, Layne et al. '731 describes conducting experiments involving robotic manipulation of conventional microtiter plates. The limited throughput of such techniques is well, known, as evidenced at least by the ninety-six (96) well capacity of the microtiter plate specifically shown and described by Layne et al. '731.
>
> By contrast, probe array experiments performed in accordance with the claimed embodiments utilize a radically different technology that differs in significant ways from the robotic microtiter technology of Layne et al. '731. One important difference between these technologies, is the vastly increased data volumes data expected to result from the probe array experiments conducted in accordance with the present invention. For example, while Layne et al. '731 describe an experiment comprising at most ninety-six (96) wells at a time, Dehlinger '320 describes experiments in which data is simultaneously collected from large arrays comprising thousands of probes:
>
> A "high-density array" of oligonucleotides, probes, or gene fragments (regions) refers to a linear array of at least 100 regions/cm, or to a planar array of at least 1,000 regions/cm^2. (Emphasis added; col. 5, lines 31-34)
>
> Thus, while conventional microtiter experiments of Layne et al. '731 would be expected to produce data from less than 100 probes at a time, the probe array experiments of Dehlinger '320 would be expected to produce data numbering in

> the thousands, or even hundreds of thousands, of probes. Reporting such voluminous experimental data over a network would require transmission of data volumes at a minimum ten times larger than any described by Layne et al. '731. Given this order of magnitude difference in data volumes expected from probe array experiments in accordance with the claimed embodiments, it is not surprising that Dehlinger '320 completely fails to provide any teaching or suggestion to communicate results from such probe array experiments over a network.
>
> Of course, the instant application is replete with teaching and suggestion to communicate results of probe array experiments over a network. However, it is emphasized that the suggestion to combine reference teachings must come from the references themselves, and cannot be derived from Applicants own teachings: (page 5, line 19 to page 7, line 6)

The Examiner first asserts that, with respect to the rejection of claims 26, 31, and 34 as being unpatentable over Layne et al. in view of Dehlinger, the invention of Dehlinger is only included to teach the aspect of arranging fluorescent probes as part of a probe array.

The Final Office Action indicated that Layne discloses performing an experiment including receiving experiment results from a network (column 8, lines 34-37 and column 15, lines 38-40) wherein the experiment is an experiment performed on a fluorescent probe (column 13, lines 63-66), but does not specifically indicate that the probe is arranged as part of a probe array.

The invention of Dehlinger is then included to teach fluorescent probes arranged as part of a probe array (column 1, lines 37-42 and column 13, lines 62-66) and therefore, the combination teaches communicating results from a probe array experiment over a computer network.

The Examiner maintains that the proposed combination of Layne and Dehlinger would only modify the invention of Layne to include arranging the probes, such as

the probes of the ninety-six wells, as part of an array and would not require any modification to the number of probes being analyzed or modify the number of probes being analyzed at one time. Consequently, the combination would still transmit the same number of results as transmitted by Layne, but now the probes would be arranged as part of a probe array.

The Examiner also asserts that the section of Dehlinger cited by Appellant indicates that the arrays refer to either "a linear array of at least 100 regions/cm, or to a planar array of at least 1,000 regions/cm^2", in accordance with a 2-25 micron diameter filament, which, with an array of 100 regions/cm, would not require an extensively large transmission of data over a computer network. Therefore, both Layne's teaching of a 96-well plate and the Dehlinger teaching of 100 regions/ cm^2 would result in a comparable number of results.

The Examiner also asserts that one having ordinary skill in the art would not consider "transmission of data over a computer network in volumes at least ten times larger than described in the Layne patent" problematic, let alone a teaching away from a combination with Layne, due to the fact that high-speed data transmission of large amounts of data is conventional in the art.

The Examiner further asserts that Appellant appears to be assuming that since Layne is performing analysis using a 96-well microtiter plate, that Layne is only

transmitting 96 data values over the communication network. The Examiner draws Appellant's attention to the following sections of Layne:

> TCSs users include laboratory technicians who load materials into automated instruments and supervise their performance on a daily basis (complete runs can amount to ~10,000 tasks, for example, which far surpass the manual scheduling capabilities of humans) and engineers who develop and debug new instruments or look for ways to improve on existing ones (column 9, lines 49-55).
>
> The detectron 135B then performs a number of detectron operations 254 including label reading, plate washing, staining, motorized indexing, and image and colorimetric analysis. To score wells in colorimetry, cell monolayers are lysed with detergents and viral antigens, and the supernatants are measured by HIV enzyme-linked immuno-sorbent assay (ELISA). Readouts from this process include the number of +/- wells per 2 ml centrifuge tube, which can be used for calculating the ID-50 and confidence limits by numerical analysis. To score wells by image analysis, cell monolayers are stained with anti-HIV immunoglobins and HIV-expressing cells are counted by imaging system. Readouts from this process include the number of HIV-expressing cells per 2 ml centrifuge tube, which are used for calculating the viral titer and confidence limits by numerical analysis.
>
> Statistical properties of the quantitative HIV infectivity assay depends on the total number of wells plated per 2 ml centrifuge tube (replicates). In general, results from counting each positive cell (image analysis) are far more precise than ID-50 methods (colorimetry). Methods based on the VACMAN computer program can be used for all ID-50 analyses (column 13, lines 18-39).
>
> Both the infectron 135A and the detectron 135B are designed for handing a wide range of viral assay conditions, permitting many different types of investigation.
>
> The infectron 135A and detectron 135B incorporate a variety of important features. They are designed for easy use by non-engineering scientists and technicians, promoting greater accessibility for research. They also handle a wide range of viral assay conditions, permitting many types of investigation. They will perform numerous assays in parallel with dynamic scheduling and rescheduling capabilities, simplifying the starting and stopping of experiments. They also use advantage of bar coding technologies for sample tracking and database management, facilitating a high throughput research environment. The process controller 128 also provides high-level tools to remote clients 100 that allow programming of in real time, enabling one instrument to perform any number of unique experiments, such as the biological assays described above. The infectron 135A and detectron 135B contain standard laboratory modules that are removable and interchangeable, permitting easier maintenance and design

> improvements. The infectron 135A and detectron 135B also comprise tolerance and error checking capabilities within relevant modules, allowing the operator to test and verify the performance of the automated instrument (column 14, lines 33-57).
>
> After these commands are verified 312 to assure that they are authorized and will not result in hazardous activity, they are provided 314 to the automated test instrument suite 130 components, including the task sequence controller 136, and thereafter, the SSMs 132 and SLMs 134. The resulting testing data results are then compiled 316 and transmitted 318 to the remote client 100. If the remote client 100 desires, the test data results can be stored 320 in database 138. (column 15, lines 34-41).
>
> As the above demonstrates, there is a need for providing testing and data dissemination services to a wide variety of globally-distributed remote clients. There is also a need to integrate the capabilities of available automated test equipment to permit a broad range of automated tests to be performed without special-purpose devices (column 15, lines 60-65).

As can be seen above, the invention of Layne considers transmitting large amounts of data over the communication network including test results based on the performance of ~10,000 tasks, obtained from "many types of investigation", a plurality of types of statistical analysis, and a broad range of automated tests. Therefore, Appellant's argument against the modification of Layne with Dehlinger because the combination would require transmission of large amounts of data is not persuasive since Layne itself considers the transmission of large amounts of data.

Appellant then argues:

> Layne et al. '731 describes only the communication of relatively small volumes of data resulting from conventional robotic microtiter techniques. While Dehlinger '320 does describe the use of probe array techniques, this reference contains no teaching or even suggestion for its combination with Layne et al.

> '731, particularly in view of the order-of-magnitude difference in data volumes required for transmission. Finally, while the instant application provides ample disclosure regarding transmission of probe array experimental data over a network, the Examiner is strictly forbidden from relying upon hindsight to use the instant application to provide a motivation to combine the teachings of Lame et al. '731 and Dehlinger '320.
>
> Owing to the failure of Layne et al. '731 et al. and Dehlinger '320 to suggest their combination to provide probe array experimental results over a computer network, it is respectfully asserted that claims 26, 31, and 34 cannot be considered obvious in light of those references. The instant claim rejections are improper and. should be withdrawn. (page 7, lines 12-23)

As noted above, the Examiner maintains that the invention of Layne considers transmitting large amounts of data over the communication network including test results based on the performance of ~10,000 tasks, obtained from "many types of investigation", a plurality of types of statistical analysis, and a broad range of automated tests. Therefore, Appellant's argument against the modification of Layne with Dehlinger because the combination would require transmission of large amounts of data is not persuasive since Layne itself considers the transmission of large amounts of data.

The Examiner also notes that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). In the instant case, it would have been obvious to one having ordinary skill in the art to modify the invention of Layne to include specifying that the probe is arranged as part of a probe array, as taught by

Dehlinger, because Layne does teach that the experiment is an experiment performed on a fluorescent probe (column 13, lines 63-66) and, as suggested by Dehlinger, the combination would have improved probe diagnosis and gene-expression studies by using probes arranged at predetermined locations as part of an array by providing to the user exaction positional data, precise labels, and the ability to monitor differences between a plurality of mutations (column 13, line 54 to column 14, line 12).

Appellant argues:

> Independent claim 32 stands rejected as obvious based upon the combination of Layne et al. '731 in view of Dehlinger '320 and further in view of Wong et al. '859. However, this further combination fails to describe the communication of experimental results from a probe array experiment over a computer network. (page 7, lines 28-31)

The Examiner first asserts that Appellant's arguments are not persuasive with respect to claim 32 because claim 32 does not require "communication of experimental results from a probe array experiment over a computer network."

Claim 32 recites:

> A method for displaying laboratory experiment information, the method using a computer system, the computer system including a processing system coupled to a network, wherein a display device and processor are coupled to the processing system, the method comprising using the processor to display steps of setup and execution of a probe array experiment over the network; and using the processor to display a result for a sample for one or more of the displayed steps.

This claimed limitation, therefore, only requires the display of steps of "setup and execution of a probe array experiment over the network; and using the processor to display a result for a sample for one or more of the displayed steps" and does not require displaying the results over a network.

The Examiner further maintains that, for the reasons provided above, the combination of Layne and Dehlinger teaches the communication of experimental results from a probe array experiment over a computer network.

With respect to the rejection of claims 26-31, 34-36, 41, 42, 51, 52, 57, and 58 under 35 U.S.C. § 103(a) as being unpatentable over McCasky Feazel et al. in view of Layne et al. Appellant argues:

> Layne et al. '731 fails to provide any teaching, or event suggestion, to communicate data from a probe array experiment over a computer network. Specifically, Layne et al. '731 describes the use of conventional robotic microtiter experimental techniques.
>
> The addition of Layne et al. '731 does nothing to supply this absent teaching. Specifically, like Dehlinger '320 discussed above, McCasky Feazel et al. '030 discloses the use of experimental techniques involving "very large scale immobilized polymer arrays ("VLSIPS™" arrays). Such probe arrays "can include millions of defined probe regions on a substrate having an area of about 1 cm^2 to several cm^2, thereby incorporating sets of from a few millions of probes" (Emphasis added; see col. 23, lines 59-64).
>
> Again however, the probe array experimental techniques employed by McCasky Feazel et al. '030, stand in stark contrast with the conventional microtiter plate technology employed by Layne et al. '731. As described above, one significant difference is the increase by at least an order or magnitude, in the volume of data expected from probe array experiments. It thus comes as no

> surprise, that like Dehlinger '320, McCasky Feazel et al. '030 is entirely silent regarding resulting communication of such large streams of probe array data results over a computer network. This conspicuous lack of any reasonable nexus between the subject matter of McCasky Feazel et al. '030 and Layne et al. '731, strongly indicates the improper use of hindsight by the Examiner in their combination. Accordingly, claims 26-31, 34-36, 41, 42, 51, 52, 57, and 58 are patentable over McCasky Feazel et al. '030 in view of Layne et al. '731. (page 8, line 25 to page 9, line 13)

The Examiner maintains that, as noted above, one having ordinary skill in the art would not consider the transmission of large amounts of data over a network problematic, let alone a teaching away from a combination with Layne, due to the fact that high-speed data transmission of large amounts of data is conventional in the art.

The Examiner also maintains that, as noted above, the invention of Layne considers transmitting large amounts of data over the communication network including test results based on the performance of ~10,000 tasks, obtained from "many types of investigation", a plurality of types of statistical analysis, and a broad range of automated tests. Therefore, Appellant's argument against the modification of Layne with McCasky Feazel because the combination would require transmission of large amounts of data is not persuasive since Layne itself considers the transmission of large amounts of data.

The Examiner also notes that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes

into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). In the instant case, it would have been obvious to one having ordinary skill in the art to modify the invention of McCasky Feazel to include conducting the experiment over a network, as taught by Layne, because, as suggested by Layne, the combination would have provided a method for allowing access to biological samples in areas where access to laboratory materials and procedures is limited (column 8, lines 1-12) as well as provide means for linking the process to additional information and/or additional users to allow more through analysis by sharing samples (column 8, lines 38-43 and column 10, line 64 to column 11, line 11).

Finally, the Examiner asserts that there is a reasonable nexus between the subject matter of McCasky Feazel and Layne as both references deal with methods for analyzing biological/genetic probes.

With respect to the rejection of claims 32, 43, 44, 49, and 50 under 35 U.S.C. § 103(a) as being unpatentable over McCasky Feazel et al. in view of Layne et al. and further in view of Wong, Appellant argues:

> [I]ndependent claim 32 is patentable over McCasky Feazel et al. '030 in view of Layne et al. '731 and further in view of Wong et al. '859 because, for instance,

the combination of references does not teach or suggest displaying a result of a probe array experiment received over a computer network. (page 9, lines 18-21)

The Examiner again asserts that claim 32 only requires the display of steps of "setup and execution of a probe array experiment over the network; and using the processor to display a result for a sample for one or more of the displayed steps" and does not require displaying the results over a network.

The Examiner also maintains that, for the reasons provided above, the combination of McCasky Feazel and Layne teaches displaying a result of a probe array experiment received over a computer network because McCasky Feazel discloses exporting/transferring the received parameters to a processor to generate experimental results (column 44, lines 36-38) and display the experimental results experiment/array images (column 53, lines 1-3), indicating hybridization information (column 3, lines 30-56), as well as displaying the current state of the experimental operation (column 49, lines 31-43).

While McCasky Feazel does describe producing and exporting a target output file, McCasky Feazel does not specifically disclose conducting the experiment over a network (i.e. transferring parameters to a network and receiving experiential results from the network).

Layne discloses a method for a user interface to accept laboratory experiment information for control of a laboratory experiment (column 3, line 60 to column 4, line 9), the method using a computer system, the computer system including a

processing system coupled to a network, wherein a user input device and processor are coupled to the processing system (column 8, lines 13-20 and Figure 5), the method comprising accepting signals from the user input device to define a parameter of an experiment (column 8, lines 27-30 and column 15, lines 58-33), transferring the parameter to the network (column 8, lines 27-30), receiving experiment results from the network, wherein the experiment results include results from an experiment using the parameter, and outputting the experiment results on the computer system (column 8, lines 34-37 and column 15, lines 38-40) via a coupled display device (column 11, lines 30-38).

Further, it would have been obvious to one having ordinary skill in the art to modify the invention of McCasky Feazel to include conducting the experiment over a network, as taught by Layne, because, as suggested by Layne, the combination would have provided a method for allowing access to biological samples in areas where access to laboratory materials and procedures is limited (column 8, lines 1-12) as well as provide means for linking the process to additional information and/or additional users to allow more through analysis by sharing samples (column 8, lines 38-43 and column 10, line 64 to column 11, line 11).

With respect to the rejection of claims 37, 38, 53, and 54 under 35 U.S.C. § 103(a) as being unpatentable over McCasky Feazel et al. in view of Layne et al. and further in view of Laughon, Appellant argues:

> Like Dehlinger '320 and McCasky Feazel et al. '030, Laughon '165 describes the use of probe array technology that would be expected to simultaneously produce results from may thousands of different probes...[a]nd also like Dehlinger '320 and McCasky Feazel et al. '030, Laughon '165 contains absolutely no teaching or event suggestion, to communicate such voluminous probe array experimental data over a computer network. Laughon '165 also fails to provide any reasonable suggestion for its combination with the conventional robotic microtiter plate technology described by Layne et al. '731. (page 10, lines 1-11)

The Examiner maintains that, for the reasons provided above, the combination of McCasky Feazel et al. in view of Layne et al. and further in view of Laughon is proper with respect to the amount of data transmitted over the network.

Further, the Examiner maintains that it would have been obvious to one having ordinary skill in the art to modify the invention of McCasky Feazel and Layne to specifically indicate that the signals control grid alignment, as taught by Laughon, because the invention of McCasky Feazel and Layne does disclose the use of a grid aligned to aid in data visualization and, as suggested by Laughon, the combination would have provided means for properly aligning the grid to the resulting data in order to insure that the data provided to the user is accurate and therefore that the resulting analysis is also accurate (column 33, line 64 to column 24, line 34).

With respect to the rejection of claims 39, 40, 55, and 56 under 35 U.S.C. § 103(a) as being unpatentable over McCasky Feazel et al. in view of Layne et al. and further in view of Lipshutz, Appellant argues:

> [F]or similar reasons stated above, claims 39 and 40 depending from claim 26, and claims 55 and 56 depending from claim 34, are patentable over McCasky

> Feazel et al. '030 in view of Layne et al. '731 and further in view of Lipshutz '729. (page 10, lines 24-26)

The Examiner maintains that, for the reasons provided above, the combination of McCasky Feazel et al. in view of Layne et al. and further in view of Lipshutz is proper with respect to the amount of data transmitted over the network.

With respect to the rejection of claims 39, 40, 55, and 56 under 35 U.S.C. § 103(a) as being unpatentable over McCasky Feazel et al. in view of Layne et al. and further in view of Wheeless, Jr., Appellant argues:

> [F]or similar reasons stated above, claims 39 and 40 depending from claim 26, and claims 55 and 56 depending from claim 34, are patentable over McCasky Feazel et al. '030 in view of Layne et al. '731 and further in view of Wheeless, Jr. et al. '537. (page 11, lines 12-14)

The Examiner maintains that, for the reasons provided above, the combination of McCasky Feazel et al. in view of Layne et al. and further in view of Wheeless, Jr. is proper with respect to the amount of data transmitted over the network.

With respect to the rejection of claims 45 and 46 under 35 U.S.C. 103(a) as being unpatentable over McCasky Feazel et al. in view of Layne et al. and Wong further in view of Laughon, Appellant argues:

> Laughon '165, however, does not cure the deficiencies previously described, in that it also fails to teach or suggest conducting or receiving data from, a probe array experiment over a computer network. Therefore, claims 45 and 46 are

> patentable over McCasky Feazel et al. '030 in view of Layne et al. '731 and Wong et al. '859 and further in view of Laughon '165. (page 11, lines 22-25)

The Examiner maintains that, for the reasons provided above, the combination of McCasky Feazel et al. in view of Layne et al. and Wong further in view of Laughon teaches conducting or receiving data from, a probe array experiment over a computer network.

With respect to the rejection of claims 47 and 48 under 35 U.S.C. 103(a) as being unpatentable over McCasky Feazel et al. in view of Layne et al. and Wong and further in view of Lipshutz et al., Appellant argues:

> As the reference combination relied upon by the Examiner fail to teach or suggest conducting a probe array experiment over a computer network. Therefore, claims 47 and 48 are patentable over McCasky Feazel et al. '030 in view of Layne et al. '731 and further in view of Lipshutz '729. (page 12, lines 3-6)

The Examiner maintains that, for the reasons provided above, the combination of McCasky Feazel et al. in view of Layne et al. and Wong and further in view of Lipshutz et al. teaches conducting a probe array experiment over a computer network.

With respect to the rejection of claims 47 and 48 under 35 U.S.C. 103(a) as being unpatentable over McCasky Feazel et al. in view of Layne et al. and Wong and further in view of Wheeless, Jr. et al., Appellant argues:

> The reference combination relied upon by the Examiner fail to teach or suggest conducting a probe array experiment over a computer network. Therefore, claims 47 and 48 are patentable over McCasky Feazel et al. '030 in view of Layne et al. '731 and further in view of Wong et al. '859 and Wheeless Jr. et al. '537. (page 12, lines 13-16)

The Examiner maintains that, for the reasons provided above, the combination of McCasky Feazel et al. in view of Layne et al. and Wong further in view of Wheeless, Jr. et al. teaches conducting a probe array experiment over a computer network.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

jrw

Conferees:

Marc S. Hoff MSH

Drew A. Dunn DAD

MARC S. HOFF
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800